and on examination with the microscope had the satisfaction of finding many of them. It seems to be proved then that the spores are floating freely in the atmosphere, and are inhaled into the air passages. The heat of the animal and the moisture of the mucous surfaces favor their germination and growth; and it seems to me possible that the epidemic catarrhal horse disease, and similar difficulties of man, may be caused by these vegetating spores, the greater or less prevalence of this class of diseases being governed by the relative numbers of the germs in air at different seasons, some seasons being more favorable to their development than others.—G. W. Morehouse, *Wayland, New York.*

Organisms in Chicago Drinking Water.—Mr. H. H. Babcock discusses this subject in a paper read at the Dubuque meeting of the American Association. His former suspicions are confirmed, that these forms are not at home in the southern end of the Lake, but are brought down from the north by a surface current along the western side of the Lake. The existence of such a current he finds further proved by the vegetation upon the shores, as he observed at least eleven species of plants established in isolated and evidently accidental positions on the shores near or below Chicago, but which belong at the northern end of the Lake or in the region of the sources of its water.

Pine Pollen in Lake Michigan.—At the Dubuque meeting of the American Association, Dr. R. H. Ward made a report on a specimen of viscid-looking water from Lake Michigan, near Racine. The water of the lake was similarly thickened for miles and was generally believed by the neighboring residents to be of an infusorial character. It contained no infusoria worth speaking of; but was almost filled with pine pollen which was interesting from its enormous quantity, and from the fact that its source could not have been near by, but must have been in the pine forests far to the north, the pollen being brought down by the southerly current along the western shore of the Lake.

NOTES.

At a meeting of the California Academy of Sciences held October 7, 1872, Mr. W. H. Dall presented a portion of the husk and inner shell of a cocoanut picked up on the north side of the Island

of Oonalashka, especially interesting as showing the direction of the ocean currents in that region.

Capt. C. M. Scammon, U. S. R. M., submitted a description of a new species of whale, *Balœnoptera Davidsoni*, the geographical range of which is from Mexico to Behring Straits; the specimen from which the description was made was taken in Admiralty Inlet, Washington Territory. It was a female twenty-seven feet in length and contained a fœtus five feet long, thus correcting a prevalent error among the whalers who have generally regarded this small species as the young of the "finback" of the coast; this animal and its habits will be fully described in the volume now being printed on the "Cetaceans and other Marine Mammals" by Capt. Scammon.

Prof. George Davidson read a paper entitled "Suggestion of a Cosmical Cause for the great Climatic Changes upon the Earth."

"Disliking theories and hypotheses, I must characterize as a suggestion what I have to state upon this subject.

So far as I am aware, geologists have failed to indicate any reasonable or rational existence of a cause for the subtropical fossil flora and fauna found within the Arctic Circle, and for the great ice-sheet—the universal glacier—which doubtless covered nearly the whole land from the poles toward the tropics at a comparatively recent period. To mention is to condemn the extravagant hypothesis of the changing of the direction of the earth's axis, as it involves changes in the gyration of the earth necessarily of greater relative amount than the motions of a boy's top. Partial upheavals and great changes of the surface of the earth are insufficient to account for the phenomena.

The palæontologist has roughly indicated by his zones of fossil floras and fossil faunas that the pole of the earth has not changed its direction, and the astronomer utterly rejects such a change.

My suggestion is that we must look to a cosmical cause for these phenomena; and that cause is in the material or materials burning upon the surface of the sun.

The spectroscope has made known to us the connection between sudden outbursts or storms upon the sun's surface, and the exhibition of magnetic or electrical phenomena on the sun. There has been established a correspondence between the eleven year period of the solar spots and certain other magnetic phenomena. This instrument has revealed to us a sun wherein a sudden outburst of

luminous hydrogen has increased the brilliancy of a star from the ninth to the second magnitude, and its comparatively slow return to its former condition.

It appears to me that herein we strike the key-note of the causes at work to solve our problem of short or long periods of varying climate upon the earth. If the above phenomenon is possible in one sun, it is possible in every one of the millions of millions of suns around us; and of course in ours. That such an eruption of burning hydrogen affects the planets revolving around that sun, we can not for one instant doubt. To our instruments it was an exhibition of force lasting but a few months, and its effect upon probable planets around that sun we can never know. Doubtless all new stars that have suddenly appeared with great brilliancy were the exhibitions of similar forces. If such forces are possible for short periods, they are possible, and to my mind more probable, for comparatively long periods. In our sun the forces are apparently evolved in irregular, and also in moderately regular periods or cycles, and must have an influence upon the general climate of the earth and of the other planets. Even in this year of exceptional heat over the earth, we have the results of the spectroscope, revealing an unusual development of incandescent magnesium over the sun's surface.

If these forces of the sun exhibit themselves in short and long periods, we can comprehend how periods of almost universal flood, of earthquake and volcanic action, of a climate to develop a subtropical fauna and flora, even within the Arctic Circle; of a great ice-sheet spreading from each pole, over the land, toward and even embracing the Equator, may be not only probable, but place the latter two in full accord with the astronomical dictum, that no violent change of the direction of the earth's axis is admissible.

The spectroscope is the present means of gathering observations to test my suggestion, or to develop the law underlying these changes; and as we observe the exhibitions of the forces upon the surface of our sun, and note the effect upon the earth, we can also watch the changes upon Mars and the other near planets. But we cannot hope to determine the law of connection within a short time, unless some wonderful event happened in our sun similar to the sudden outburst of luminous hydrogen in the star in the Northern Crown, to show us in an hour the effect such great cosmical changes have upon the earth and other planets of our

system; or unless other instrumental means far beyond the capacity of the spectroscope be devised to show minute connections between changes on the sun's surface and limited periods of phenomena on the earth, such as years of great heat, and earthquake and volcanic activity, perhaps even years of pestilence. A long cycle of years may be required to demonstrate whether a law lies at the base of my suggestion.

Like the observers who make their measures to determine the gradual elevation or subsidence of continental shores, we may not learn the result, but we can aggregate observations for discussion by the next generation."

Mr. W. H. Dall submitted descriptions of new species of shells from the northwest coast of America with notes on species previously described; this paper includes a description of a new species of Voluta of the group Scaphella, particularly interesting as being the first of this family from so high a northern station (Shumagin Island) though allied forms have long since been reported from the Straits of Magellan. To this species, which is of large size, being over four inches in length, Mr. Dall has given the name of *Voluta Stearnsii*. *Buccinum Kennicottii* Dall, described in one of the latter numbers of the "American Journal of Conchology," proves to be a Chrysodomus. A new species of Littorina is also described in this paper as *L. Aleutica* Dall.

Professor Davidson called the attention of the Academy to the earthquake waves recorded by the tidal gauges on this coast on the 23d to 27th of August and on the 16th to 17th of September last. He demonstrated by deductions from the relative rapidity and heights of the waves at different points, that the main shock of the first must have been near the northern coast of the island of Yesso, Japan, and that the latter had originated not far distant in the ocean from the points of observation.

Mr. Stearns read a paper pointing out the predominance, in the Californian and Vancouver zoological provinces, of mollusks included in the Order Scutibranchiata (*Vide* Adams' Genera) as compared with the Atlantic coast of America from the Arctic seas to Georgia.

H.M.S. "Challenger" corvette, of 2306 tons, Commander G. S. Nares, has been despatched by the Admiralty on a circumnavigation of the globe, for the purpose of dredging, sounding, and

otherwise scientifically investigating the deep sea. The scientific staff consists of Prof. Wyville Thompson, Director; Mr. J. J. Wild, of Zurich, artist and private secretary; Mr. J. Y. Buchanan, chemist; Mr. H. N. Mosely, Mr. John Murray, and Dr. von Willemoes Suhm, of Munich, naturalists. The expedition is expected to return in April 1876. They will visit Madeira, Canaries, Porto Rico, New York, Azores, Cape de Verde, Fernando de Noronha, Bahia, Cape of Good Hope, Prince Edward's Isle, Crozets, Kerguelen's Land, Melbourne, and possibly sail round New Zealand, thence round North Australia, follow Wallace's line up to the Philippines, touch New Guinea, Japan, Kamtschatka, Behring's Straits, Vancouver's Island to Varparaiso; thence through the Straits of Magellan to Rio, and so home. Though no botanist is attached to the staff, it is understood that Mr. Mosely will collect plants on every possible occasion.

THE immediate value of geological surveys is again shown in the prompt detection of the recent diamond fraud. Mr. Clarence King, the U. S. Geologist, and his assistant Mr. J. T. Gardiner, visited Bishop Mountain and finding diamonds and rubies there that had been scattered over the soil by another hand than Nature's, exposed a gigantic and disgraceful swindle. The New York "Nation" makes some timely remarks on the value of the unbiassed opinions and observations of a national geologist. Certainly by the exposure of this fraud, the government survey of the public lands has more than paid for all the funds appropriated by Congress, and justifies the conclusion that the largest liberality in scientific enterprises is the truest economy—in short, science pays.

PROF. F. V. HAYDEN is desirous of securing by exchange or purchase, the publications of our own as well as foreign countries on Geology, Palæontology, and Natural History generally, to aid in the formation of a library of reference, for the use of the survey of which he has charge. The reports of surveys, with maps, charts, and sections, transactions of societies, or the publications of individuals engaged in scientific studies, are much desired as works of reference. Parties who may look favorably upon the above proposition can send all packages, through the Smithsonian Institution, to the address of Dr. F. V. HAYDEN, U. S. Geologist, Washington, D. C.